**Review Outline**

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**NYS 8th Grade Science Assessment**

**1) Living Systems: Organisms**

**Points to remember**

* All living things carry out life processes. These include nutrition,respiration, transport, excretion, regulation, reproduction, and growth.
* All living things are composed of basic units called cells. Plant cells and animal cells have common structures. These include nucleus, cytoplasm, and cell membrane.
* Cells carry out life processes.
* Plant cells have cell walls and chloroplasts, which are not found in animal cells. Plants manufacture their own food by a process called photosynthesis.
* Animals take in nutrients for energy and growth
* Some microorganisms are harmful and can cause diseases called infectious diseases.

**2) Living Systems: Ecosystems**

**Points to Remember**

* Living things and the nonliving factors in their surroundings make up an ecosystem. Adaptations allow an organism to survive in a particular type of ecosystem.
* Ecological succession is a natural process by which one community is replaced by another community in an orderly, predictable sequence.
* Green plants use sunlight to make their own food. They are called producers. Animals depend on other organisms for food. They are called consumers. All organisms get their energy directly or indirectly from the sun.
* Decomposers are organisms that break down the remains of dead plants and animals. Decomposers return nutrients to the environment.
* Producers, consumers, and decomposers may be linked in a sequence called a food chain. Disturbing any part of a food chain affects other organisms in the food chain.
* There is a continual exchange of materials between an organism and its environment: these materials include food, water, oxygen, and wastes.

**3) Living Systems: Biological Diversity and Heredity**

**Points to Remember**

* Biologists classify organisms based on shared characteristics
* Genetic information is passed from one generation to the next through chromosomes during reproduction.
* Mitosis produces two new cells with the same number of chromosomes as the original.
* Meiosis produces sex cells that contain half as many chromosomes as regular body cells.
* A Punnett Square can be used to predict the probability of inheriting a trait.
* A change in a gene is called a mutation. Mutations may contribute to a gradual change in a species. This process, called evolution, is very slow.

**4) Living Systems: Human Systems**

**Points to Remember**

* Complex organisms, such as humans, show several levels of body organization.
* Cells are the basic unit of life. Tissues are groups of similar cells that work together to carry out a life process. Organs are groups of tissues that work together to carry out life process.
* Organ systems are groups of organs that work together to carry out a life process. Different organ systems work together to carry out life processes.
* The human body includes the following types of tissues: blood, bone, muscle, nerve, and skin.
* The human body includes the following systems: skeletal, muscular, nervous, endocrine, digestive, circulatory, respiratory, excretory, and reproductive.
* All the body systems are interdependent; for example, the nervous system and endocrine system act together to regulate and control body activities.
* The circulatory system and respiratory system work together to bring oxygen in the blood to all body cells.

**5) Earth’s Surface**

**Points to Remember**

* Physical and chemical properties, such as hardness, streak, color, cleavage, and reaction to acid are used in mineral identification.
* Rocks are composed of one or more minerals. The three types of rocks – igneous, sedimentary, and metamorphic- are classified according to their method of formation. The rock cycle demonstrates how various processes can transform rocks from one type to another.
* Fossils are the remains or traces of organisms that lived long ago. They are used to determine past environments and climate. Fossils are usually found in sedimentary rocks.
* The study of rock formations provides clues to the history of crustal activity in an area.
* Topographic maps are a graphic representation of Earth’s surface. Contour lines are used to show the shape of the land.
* Earth has a grid system that consists of west-east lines of latitude and north-south lines of longitude. Using a compass and a topographic map, direction points can be accurately determined.

**6) Forces that Change Earth’s Surface**

**Points of Remember**

* External forces associated with weathering and erosion wear down Earth’s surface. Internal forces associated with faulting and volcanism build up Earth’s surface.
* Weathering is the breaking down of rocks into smaller pieces. Weathering is caused by physical agents such as ice wedging and chemical agents such as oxygen rusting iron in rocks.
* Erosion is the transport of rock material from one place to another. Running water is the major agent of erosion.
* Change in Earth’s surface is the result of the interactions of the lithosphere, hydrosphere, and atmosphere over various ranges of time.
* Plate tectonics explains how the crust consists of a series of plates that move and interact causing earthquakes and volcanoes. Most earthquakes and volcanoes are located on the plate boundaries.
* Major seafloor features are associated with the plate tectonics. Mid-ocean ridges are areas where hot rock material comes to Earth’s surface and pushes outward in both directions. Trenches are deep, ocean-floor features where one plate slides down under another plate.
* Continental drift was initially supported by the fit of the continents, fossil correlation, and rock formations. Today plate tectonics and ocean-floor spreading strongly support that the continents were once together.

**7) Weather and Climate**

**Points to Remember**

* Weather is the present state of the atmosphere at a given location for a short period of time. Climate is the average weather that prevails over a large area for a long period of time.
* The atmosphere consists of mostly nitrogen and oxygen. It can be divided into layers by temperature. Almost all weather takes place in the lowest layer, the troposphere.
* The sun is the primary source of energy affecting Earth’s surface. Weather changes occur due to uneven heating of the Earth’s surface by the sun.
* Air masses are large bodies of air with similar temperature and humidity conditions. Most weather changes are due to the movement of air masses.
* Air pressure systems are either high or low pressure systems. A high pressure system brings fair weather; a low pressure system brings stormy weather.
* Weather maps show the positions of air masses, fronts, and weather elements at many locations.

**8) Astronomy**

**Points to Remember**

* Rotation is the spinning of Earth on its axis, which causes day and night. It takes Earth 24 hours (one day) to complete one rotation.
* Revolution is Earth’s motion around the sun; it takes Earth 365.25 days (one year) to complete one revolution around the sun.
* Earth’s axis is tilted 23.5 degrees to the plane of its orbit. The northern end of Earth’s axis (North Pole) points toward the North Star. The seasons are caused by the tilt of Earth’s axis as it revolves around the sun. This tilt causes the sun’s vertical rays to strike Earth farthest north on June 21st and farthest south on December 21st.
* Our solar system consists of the sun, the nine planets, satellites, asteroids, meteoroids, and comets. The sun is at the center; its gravity keeps all other members of the solar system in orbits around the sun.
* The universe contains trillions of stars, most clustered together in galaxies. Most of the universe is considered to be empty space. Our sun is an average star, one of 800 billion stars clustered in a spiral galaxy called the Milky Way.

**9) Matter**

**Points to Remember**

* Matter is anything that has mass and occupies space. Matter can exist as a solid, liquid, or gas.
* Elements are substances that cannot be broken down into simple substances. Two or more elements can combine to form a compound.
* Atoms are composed of protons, neutrons, and electrons.
* Changes in matter may be physical or chemical. During a chemical change, new substances are formed. Mixtures do not form new substances. Solutions are mixtures. The parts of a mixture can be separated by physical changes, such as filtering and evaporating.
* Density = Mass/volume. Floating and sinking depend on differences in density.
* Matter can neither be created nor destroyed in a chemical reaction. Energy can either be absorbed or released during a chemical change. The rates of chemical reactions and dissolving are influenced by such factors as temperature and particle size.

**10) Motion and Machines**

**Points to Remember**

* A force is a push or a pull. Balanced forces acting on an object cause the object to be at rest, and unbalanced forces acting on an object cause the object to move.
* Mass is a measure of the amount of matter in an object. The weight of an object is a measurement of the gravitational pull on the object. The amount of gravitational force produced depends on the mass of an object and the distance from its center to the center of the object that is pulling on it.
* Speed, velocity, and acceleration are ways of describing the motion of an object.
* Newton’s first law states that an object at rest will remain at rest and an object in motion will remain in motion, unless force acts on it. Newton’s second law states that the acceleration of an object depends directly on the force applied and inversely on its mass. Newton’s third law states that every action has an equal and opposite reaction
* Work is done when an applied force moves an object. Machines make work easier. The six simple machines are the lever, screw, inclined plane, pulley, wheel and axle, and wedge.

**11) Energy**

**Points to Remember**

* Energy is the ability to do work. There are two states of energy: potential and kinetic. Energy occurs in the following forms: mechanical, chemical, nuclear, sound, heat, electric, and light.
* The Law of Conservation of Energy states that energy cannot be created or destroyed, it can only be transformed into other forms of energy.
* An electric circuit is a complete path for the flow of electricity. A circuit contains an electrical source, a conducting path, and a device that uses the electricity.
* Sound and light travel in waves.

**12) Energy and Resources**

**Points to Remember**

* Fossil fuels, our main source of energy, come from the remains of dead plants and animals. Fossil fuels are nonrenewable resources.
* Burning fossil fuels produces gases such as carbon dioxide and other pollutants, which may affect Earth’s atmosphere.
* Other sources of energy include hydroelectric, nuclear, solar, and wind. Each type of energy has advantages and disadvantages.
* It is important to conserve our energy supply. Methods of conserving energy include reducing consumption, recycling materials, and reusing materials.

**13) Science, Technology, and Society**

**Points to Remember**

* The emphasis in science is on gaining knowledge of the natural world by asking questions; the emphasis in technology is on finding practical ways to apply that knowledge to solve problems. Science and technology frequently help to advance each other. The search for knowledge is a driving force for science and technology.
* We all interact with products of technology in almost everything we do.
* Technology is used to extend or improve our abilities, and many products of technology affect the environment in some way.
* Science, technology, and society are constantly interacting. Often, a change in one of these areas will affect the other two.
* Every technological process or device has advantages and disadvantages associated with its use.